

AUTHOR INDEX

(*Italic page numbers indicate senior authorship*)

- Al-Abbas, H., 103-107
 Alben, A. O., 179-182
 Anderson, D. M., 214-219
 Asbell, C. W., 108-112
 Axley, J. H., 209-213
 Barber, S. A., 103-107
 Batchelder, A. R., 25-33
 Bear, F. E., 75
 Beckett, P., 367-383
 Bernardin, J. E., 411-416
 Bhumbala, D. R., 119-126
 Bidwell, O. W., 58-62
 Black, W. R., 384-390
 Bolt, G. H., 293-299, 344-349
 Bosma, S., 350-357
 Bowen, H. J. M., 252-259
 Brown, J., 187-195
 Bullock, J. S., 350-357
 Bunting, B. T., 353-359
 Cannell, G. H., 108-112
 Cawse, P. A., 252-259
 Childs, E. C., 173-178
 Clark, F. E., 13-18
 Clutter, J. L., 19-24
 Coleman, N. T., 229-232
 De Haan, F. A. M., 344-349
 DeSilva, J. A., 63-73
 Doering, E. J., 312-319
 Douglass, J. E., 19-24
 Dubey, H. D., 334-340
 Dutt, G. R., 344-349
 Dyrness, C. T., 391-399
 Eaton, F. M., 411-416
 Fiskell, J. G. A., 320-327
 Flannery, R. D., 233-241
 Fox, R. H., 421-427
 Fox, R. L., 4-12
 Franklin, R. E., Jr., 260-267
 Freeman, J. F., 334-340
 Frere, M. H., 209-213
 Fukuda, H., 281-285
 Fuller, W. H., 350-357, 421-427
 Gallatin, M. H., 25-33
 Gilmour, C. M., 428-430
 Gupta, U. C., 328-333
 Hammar, H. E., 179-182
 Hannapel, R. J., 350-357, 421-427
 Hewlett, J. D., 19-24
 Hole, F. D., 58-62
 Hourigan, W. R., 119-126
 Johnson, H. P., 113-118
 Jungerius, P. D., 89-95
 Kelley, W. P., 80-88
 Kemper, W. D., 13-18
 Kirkham, D., 113-118, 145-151, 233-241
 Kunze, R. J., 145-151
 Lahav, N., 283-289
 Larsen, S., 196-201
 Levelt, T. W. M., 89-95
 Levine, G., 48-57, 133-140
 Ligon, J. T., 113-118
 Lipps, R. C., 4-12
 Longenecker, D. E., 268-275
 Low, P. F., 344-349
 Lunin, J., 25-33
 Lyerly, P. J., 268-275
 Malo, B. A., 242-247
 Mandal, L. N., 127-132
 McGeorge, W. T., 76-79
 McLean, E. O., 119-126, 260-267
 McNeal, B. L., 96-102, 367-375
 Middleton, K. R., 221-228
 Moodie, C. D., 202-208
 Murari, K., 341-343, 417-420
 Nelson, L. E., 300-306
 Norman, A. G., 361-366
 Okazaki, R., 202-208
 Olsen, S. R., 13-18
 Parr, J. F., 361-366
 Peaslee, D. E., 248-251
 Puri, B. R., 341-343, 417-420
 Purvis, E. R., 242-247
 Raychaudhuri, S. P., 43-47
 Reeve, R. C., 312-319
 Rich, C. I., 384-390
 Rosell, R. A., 152-167
 Sansoterra, T., 367-375
 Seginer, I., 48-57, 133-140
 Shoemaker, H. E., 119-126
 Shull, H., 279-280
 Smith, H. W., 202-208
 Smith, R. M., 183-186
 Soulides, D. A., 286-289
 Sowden, F. J., 328-333
 Spencer, W. F., 320-327
 Sposito, G., 214-219
 Stamey, W. L., 183-186
 Stockinger, K. R., 312-319
 Sutton, C. D., 196-201
 Tedrow, J. C. F., 187-195
 Thomas, G. W., 229-232

Tinsley, J., 34-42

Toth, S. J., 63-73

Ulrich, A., 152-167

Watanabe, F. S., 13-18

Westgarth, D. R., 221-228

Whitehead, D. C., 34-42

Wiklander, L., 168-172

Wilde, S. A., 276-278

Wullstein, L. H., 428-430

Youngberg, C. T., 391-399

Youngs, E. G., 307-311

Zaslavsky, D., 400-410

SOIL SCIENCE

VOLUME 97
JANUARY to JUNE, 1964

RUTGERS UNIVERSITY
NEW BRUNSWICK, NEW JERSEY
U. S. A.

PUBLISHED BY
THE WILLIAMS & WILKINS COMPANY
BALTIMORE, MARYLAND

SOIL SCIENCE

Editor-in-Chief
FIRMAN E. BEAR

Associate Editor
WILLIAM J. HANNA

Managing Editor
RUTH M. FIELD

CONSULTING EDITORS

R. B. ALDERFER
Rutgers University, New Brunswick, New Jersey
LYLE T. ALEXANDER
U. S. Plant Industry Station, Beltsville, Maryland
W. H. ALLAWAY
Soil and Animal Nutrition Lab., Ithaca, New York
SHIGENORI AOMINE
Kyushu University, Fukuoka, Japan
L. D. BAVER
Sugar Planters' Expt. Sta., Honolulu, Hawaii
C. A. BLACK
Iowa State University, Ames
J. A. BONNET
University of Puerto Rico, Rio Piedras
C. A. BOWER
U. S. Regional Salinity Lab., Riverside, California
R. H. BRAY
University of Illinois, Urbana
F. E. BROADBENT
University of California, Davis
E. C. CHILDS
Cambridge University, Cambridge, England
MARLIN G. CLINE
Cornell University, Ithaca, New York
N. T. COLEMAN
University of California, Riverside
O. W. DAVIDSON
Rutgers University, New Brunswick, New Jersey
L. DELEENHEER
Royal Agricultural College, Ghent, Belgium
MACK DRAKE
University of Massachusetts, Amherst
C. H. EDELMAN
Agricultural College, Wageningen, The Netherlands
M. M. ELGABALY
Alexandria University, Alexandria, Egypt
WOLFGANG FLAIG
Soil Biochem. Inst., Braunschweig-Volkenrode, W. Germany
STERLING B. HENDRICKS
U. S. Plant Industry Station, Beltsville, Maryland
S. HENIN
National Center Agronomic Res., Paris, France
M. L. JACKSON
University of Wisconsin, Madison
HANS JENNY
University of California, Berkeley
H. L. JENSEN
State Laboratory of Plant Culture, Lyngby, Denmark
LOUIS T. KARDOS
Pennsylvania State University, University Park
CHARLES E. KELLOGG
U. S. Soil Conservation Service, Washington, D. C.
DON KIRKHAM
Iowa State University, Ames
GEORGE W. KUNZE
Agr. and Mech. College of Texas, College Station

J. LÅG
Agricultural College of Norway, Vollebekk
KIRK LAWTON
Michigan State University, East Lansing
PHILIP F. LOW
Purdue University, Lafayette, Indiana
C. E. MARSHALL
University of Missouri, Columbia
W. P. MARTIN
University of Minnesota, St. Paul
A. R. MIDGLEY
University of Vermont, Burlington
E. G. MULDER
Agricultural College, Wageningen, The Netherlands
A. G. NORMAN
University of Michigan, Ann Arbor
J. B. PAGE
Iowa State University, Ames
ROBERT W. PEARSON
U. S. Plant Industry Station, Beltsville, Maryland
MICHAEL PEECH
Cornell University, Ithaca, New York
W. H. PIERRE
Iowa State University, Ames
E. R. PURVIS
Rutgers University, New Brunswick, New Jersey
S. P. RAYCHAUDHURI
Indian Agr. Res. Institute, New Delhi
C. I. RICH
Virginia Polytechnic Institute, Blacksburg
L. A. RICHARDS
U. S. Regional Salinity Lab., Riverside, California
E. W. RUSSELL
East African Agr. and For. Res. Organ., Kikuyu, Kenya
M. B. RUSSELL
University of Illinois, Urbana
LOYD F. SEATZ
University of Tennessee, Knoxville
ROY W. SIMONSON
U. S. Soil Conservation Service, Washington, D. C.
ROBERT L. STARKEY
Rutgers University, New Brunswick, New Jersey
C. G. STEPHENS
Division of Soils, C.S.I.R.O., Adelaide, S. Australia
A. B. STEWART
Macaulay Inst. Soil Res., Aberdeen, Scotland
N. H. TAYLOR
Soil Bureau, D.S.I.R., Lower Hutt, New Zealand
J. C. F. TEDROW
Rutgers University, New Brunswick, New Jersey
STEPHEN J. TOTH
Rutgers University, New Brunswick, New Jersey
R. C. TURNER
Soil Research Institute, Dept. Agr., Ottawa, Canada
T. WALSH
The Agricultural Institute, Dublin, Ireland
LAMBERT WIKLANDER
Royal Agricultural College, Uppsala, Sweden

HONORARY CONSULTING EDITORS: Wm. A. Albrecht; R. V. Allison; G. B. Bodman; Richard Bradfield; H. J. Conn; H. P. Cooper; E. E. DeTurk; F. L. Duley; Willard Gardner; C. D. Jeffries; W. P. Kelley; Herminie B. Kitchen; H. Lundergårdh; Sante Mattson; W. T. McGeorge; A. Mehlich; C. A. Moers; Arthur L. Prince; C. O. Rost; E. J. Russell; C. J. Schollenberger; Oswald Schreiner; E. Truog; S. C. Vandecaveye; N. J. Volk; and Selman A. Waksman.

COPYRIGHT ©, 1964, THE WILLIAMS & WILKINS COMPANY

CONTENTS

Jacob Samuel Joffe (1886-1963)	3
Root Activity of Sub-Irrigated Alfalfa as Related to Soil Moisture, Temperature, and Oxygen Supply. R. C. LIPPS AND R. L. FOX	4
Effect of Hexadecanol on Evaporation of Water from Soil. S. R. OLSEN, F. S. WATANABE, F. E. CLARK, AND W. D. KEMPER	13
Instrumental and Soil Moisture Variance Using the Neutron-Scattering Method. JOHN D. HEWLETT, JAMES E. DOUGLASS, AND JEROME L. CLUTTER	19
Interactive Effects of Base Saturation and Exchangeable Sodium on the Growth and Cation Composition of Beans. J. LUNIN, M. H. GALLATIN, AND A. R. BATCHELDER	25
Extraction of Soil Organic Matter with Dimethylformamide. D. C. WHITEHEAD AND J. TINSLEY	34
Agricultural Land Resources of India. S. P. RAYCHAUDHURI	43
Infiltration of Water under Pressure from a Piezometer Cavity into a Homogeneous Soil: 1. One-Dimensional Infiltration. I. SEGNER AND G. LEVINE	48
Numerical Taxonomy and Soil Classification. O. W. BIDWELL AND F. D. HOLE	58
Cation-Exchange Reactions, Electrokinetic, and Viscometric Behavior of Clay-Organic Complexes. J. A. DESILVA AND S. J. TOTH	63
Book Reviews	74
On the Eighty-Sixth Birthday of Walter Pearson Kelley. FIRMAN E. BEAR	75
Dr. W. P. Kelley—California Called. W. T. McGEORGE	76
Review of Investigations on Cation Exchange and Semiarid Soils. W. P. KELLEY	80
Clay Mineralogy of Soils over Sedimentary Rocks in Eastern Nigeria. P. D. JUNGERIUS AND T. W. M. LEVELT	89
Effect of Exchangeable Cations on Glycol Retention by Clay Minerals. BRIAN L. McNEAL	96
Effect of Root Growth and Mass-Flow on the Availability of Soil Calcium and Magnesium to Soybeans in a Greenhouse Experiment. H. AL-ABBAS AND S. A. BARBER	103
Prefabrication of Mold and Construction of Cylindrical Electrode-Type Resistance Units. GLEN H. CANNELL AND C. W. ASBELL	108
The Falling Water Table between Open Ditch Drains. JAMES T. LIGON, DON KIRKHAM, AND HOWARD P. JOHNSON	113
Aluminum in Soils: V. Form of Aluminum as a Cause of Soil Acidity and a Complication in Its Measurement. E. O. McLEAN, W. R. HOURIGAN, H. E. SHOEMAKER, AND D. R. BHUMBALA	119
Effect of Time, Starch, and Lime on the Transformation of Inorganic Phosphorus in a Water-Logged Rice Soil. L. N. MANDAL	127
Infiltration of Water under Pressure from a Piezometer Cavity into a Homogeneous Soil: 2. Hele-Shaw Model Experiments. I. SEGNER AND G. LEVINE	133
Book Reviews	141
Capillary Diffusion and Self-Diffusion of Soil Water. R. J. KUNZE AND DON KIRKHAM	145
Critical Zinc Concentrations and Leaf Minerals of Sugar Beet Plants. RAMON A. ROSELL AND ALBERT ULRICH	152
Uptake, Adsorption, and Leaching of Radiostrontium in a Lysimeter Experiment. LAMBERT WIKLANDER	168
The Ultimate Moisture Profile during Infiltration in a Uniform Soil. E. C. CHILDS	173
Soil Penetration and Uptake of P and K in a 10-Year NPK Fertilizer Experiment with Schley Pecan Trees. A. O. ALBEN AND H. E. HAMMAR	179
A Conservation Definition of Erosion Tolerance. WILLIAM L. STAMEY AND R. M. SMITH	183
Soils of the Northern Brooks Range, Alaska: 4. Well-Drained Soils of the Glaciated Valleys. J. BROWN AND J. C. F. TEDROW	187
Pyrophosphate as a Source of Phosphorus for Plants. C. D. SUTTON AND S. LARSEN	196
Some Problems in Interpreting Cation-Exchange-Capacity Data. ROSE OKAZAKI, HENRY W. SMITH, AND C. D. MOODIE	202

Cation Uptake by Excised Barley Roots from Solutions and Suspensions. M. H. FRERE AND J. H. AXLEY	209
Heat of Immersion of Arizona Bentonite in Water. DUWAYNE M. ANDERSON AND GARRISON SPOSITO	214
Announcement (The Clay Minerals Society)	220
A Rapid Method for Estimating Exchangeable Hydrogen and Exchange Capacity in Soils of the Moist Tropics. K. R. MIDDLETON AND D. R. WESTGARTH	221
The Fate of Exchangeable Iron in Acid Clay Systems. G. W. THOMAS AND N. T. COLEMAN	229
A Soil Core Water Permeameter for Field Use. ROBERT D. FLANNERY AND DON KIRKHAM	233
Soil Adsorption of Atmospheric Ammonia. BERNARD A. MALO AND E. R. PURVIS	242
Colorimetric Determination of Calcium in Soil Extracts. D. E. PEASLEE	248
Effects of Ionizing Radiation on Soils and Subsequent Crop Growth. H. J. M. BOWEN AND P. A. CAWSE	252
Cationic Activities in Clay Suspensions and Equilibrium Dialyzates. E. O. McLEAN AND R. E. FRANKLIN, JR.	260
Making Soil Pastes for Salinity Analysis: A Reproducible Capillary Procedure. DONALD E. LONGENECKER AND PAUL J. LYERLY	268
Changes in Soil Productivity Induced by Pine Plantations. S. A. WILDE	276
Influence of Installation Depth on Infiltration from Unbuffered Cylinder Infiltrimeters. HOLLIS SHULL	279
Subdrainage in Heavy Soils. Theoretical Considerations. HITOSHI FUKUDA	281
Antibiotics in Soils: VI. Determination of Micro-Quantities of Antibiotics in Soil. D. A. SOULIDES	286
Book Reviews	290
Self-Diffusion of Ca45 into Certain Carbonates. N. LAHAV AND G. H. BOLT	293
Status and Transformation of Sulfur in Mississippi Soils. L. E. NELSON	300
An Infiltration Method of Measuring the Hydraulic Conductivity of Unsaturated Porous Materials. E. G. YOUNGS	307
Salt Accumulation and Salt Distribution as an Indicator of Evaporation from Fallow Soils. E. J. DOERING, R. C. REEVE, AND K. R. STOCKINGER	312
Forms of Phosphate in Lakeland Fine Sand After Six Years of Heavy Phosphate and Lime Applications. J. G. A. FISKELL AND W. F. SPENCER	320
Isolation and Characterization of Cellulose from Soil Organic Matter. UMESH C. GUPTA AND F. J. SOWDEN	328
Influence of Soil Properties and Microbial Activity on the Phytotoxicity of Linuron and Diphenamid. H. D. DUBEY AND J. F. FREEMAN	334
Studies in Surface Area Measurements of Soils: 2. Surface Area from a Single Point on the Water Isotherm. BALWANT RAI PURI AND K. MURARI	341
Diffusion of Alkali Chlorides in Clay-Water Systems. A Discussion of a Report by GORDON R. DUTT AND PHILIP F. LOW. I: Comment on the Report by G. H. BOLT AND F. A. M. DE HAAN; and II: Response to BOLT-DE HAAN Comment by PHILIP F. LOW AND GORDON R. DUTT	344
Phosphorus Movement in a Calcareous Soil: I. Predominance of Organic Forms of Phosphorus in Phosphorus Movement. R. J. HANNAPEL, W. H. FULLER, SHIRLEY BOSMA, AND J. S. BULLOCK	350
NOTE: Pioneers of Soil Science—A British View. B. T. BUNTING	358
Growth and Activity of Soil Microorganisms in Glass Micro-beads: I. Carbon Dioxide Evolution. J. F. PARR AND A. G. NORMAN	361
Mineralogical Examination of Arid-Land Soils. B. L. McNEAL AND T. SANSOTERRA	367
Potassium-Calcium Exchange Equilibria in Soils: Specific Adsorption Sites for Potassium. PHILIP BECKETT	376
Potassium Exchange as Affected by Cation Size, pH, and Mineral Structure. C. I. RICH AND W. R. BLACK	384
Some Physical and Chemical Properties of Pumice Soils in Oregon. C. T. YOUNGBERG AND C. T. DYRNES	391

CONTENTS

v

Theory of Unsaturated Flow into a Non-Uniform Soil Profile. DAN ZASLAVSKY.....	400
Mass-Flow and Salt Accumulations by Plants on Water Versus Soil Cultures. FRANK M. EATON AND JOHN E. BERNARDIN.....	411
Studies in Surface-Area Measurements of Soils: 3. Sorption of Stearic Acid and Iodine as a Measure of External Surface. BALWANT RAI PURI AND K. MURARI.....	417
Phosphorus Movement in a Calcareous Soil: II. Soil Microbial Activity and Organic Phosphorus Movement. R. J. HANNAPEL, W. H. FULLER, AND R. H. FOX.....	421
Non-Enzymatic Gaseous Loss of Nitrite from Clay and Soil Systems. LEROY H. WULLSTEIN AND C. M. GILMOUR.....	428
Index.....	431

AUTHOR INDEX

(*Italic page numbers indicate senior authorship*)

- Abdou, F. M., 94-99
 Aljibury, F. K., 129-132
 Anderson, W. D., 377-382
 Armstrong, D. E., 39-52
 Ashley, D. A., 156-161, 322-327
 Avnimelech, Y., 222-226
 Awan, A. B., 204-205
 Ayres, A. S., 338-344
 Bartlett, R. J., 351-357
 Bennett, O. L., 156-161, 322-327
 Bingham, F. T., 4-8
 Bisal, F., 345-346
 Bowen, H. J. M., 358-361
 Bozer, K. B., 235-243
 Bradford, G. R., 4-8
 Broadbent, F. E., 118-128
 Brown, A. L., 170-173
 Brown, J. C., 362-370
 Bruce, R. R., 332-337
 Bruggenwert, T., 281-289
 Burnett, E., 174-180
 Carlson, C. W., 244-248
 Casida, L. E., Jr., 371-376
 Cate, R. B., Jr., 85-93
 Cawse, P. A., 358-361
 Chahal, R. S., 107-112
 Chesters, G., 39-52
 Clark, J. S., 145-151, 302-306
 Dahnke, W. C., 33-38
 Doss, B. D., 156-161, 322-327
 Douglas, L. A., 53-65
 Dutt, G. R., 377-382
 Duvdevani, A., 14-21
 Ellis, R., Jr., 388-394
 Fox, W. E., 307-316, 413
 Foy, C. D., 362-370
 Frissel, M. J., 274-277
 Gastuche, M. C., 281-289
 Goldston, E. F., 22-32
 Gollan, J., 206
 Gupta, R. J., 73-77
 Gurney, E. L., 9-13
 Haas, H. J., 244-248
 Halevy, E., 66-67
 Handa, B. D., 264-269
 Hanna, W. J., 227-234
 Hemwall, J. B., 235-243
 Hoyle, M. C., 295-299
 Iyer, J. G., 162-169
 Jackman, R. H., 118-128
 Jaworski, C. A., 227-234
 Jurinak, J. J., 170-173
 Kanehiro, Y., 249-255
 Kanwar, J. S., 403-407
 Kelley, W. P., 113-117, 408-412
 Klein, D. A., 371-376
 Larsen, S., 94-99
 Larson, G. O., 328-331
 Leaf, A. L., 395-402
 Levy, R., 152-155
 Mader, D. L., 295-299
 Malcolm, J. L., 33-38
 Marsh, A. W., 129-132
 Martin, J. P., 270-273
 McCracken, R. J., 22-32
 McNicoll, J., 118-128
 Menéndez, M. E., 33-38
 Mor (Muravsky), E., 152-155
 Mortland, M. M., 281-289
 Nevo, Z., 222-226
 Nielsen, K. F., 345-346
 Nishita, H., 181-186
 Page, A. L., 4-8, 270-273
 Parkinson, H. L., 244-248
 Peck, A. J., 290-294
 Poelstra, P., 274-277
 Randhawa, N. S., 403-407
 Rich, C. I., 100-106
 Richards, S. J., 129-132
 Richer, A. C., 204-205
 Robinson, F. E., 206-207
 Romkens, M. J. M., 332-337
 Salmon, R. C., 213-221
 Sanders, K. B., 300-301
 Santoro, T., 371-376
 Savant, N. K., 338-344
 Schnitzer, M., 197-203
 Sherman, G. D., 249-255
 Sherman, L. R., 328-331
 Shull, H., 192-196
 Singh, S. S., 383-387
 Skinner, S. I. M., 197-203
 Stanford, G., 338-344
 Sukhai, A. P., 85-93
 Swartzendruber, D., 73-77
 Tamimi, Y. N., 249-255
 Tanzer, C., 162-169
 Taylor, A. W., 9-13
 Taylor, H. M., 174-180
 Taylor, P., 181-186
 Tedrow, J. C. F., 53-65
 Thomas, J. R., 78-84
 Trautmann, W. L., 162-169
 Tzur, Y., 66-67
 Warneke, J. E., 129-132
 Watterston, K. G., 162-169
 Weed, S. B., 22-32
 White, E. H., 395-402
 White, E. M., 187-191, 256-263
 Wilde, S. A., 162-169
 Willis, W. O., 244-248
 Youngs, E. G., 290-294
 Yuan, T. L., 133-141
 Zaslavsky, D., 317-321

SOIL SCIENCE

VOLUME 98
JULY to DECEMBER, 1964

RUTGERS UNIVERSITY
NEW BRUNSWICK, NEW JERSEY
U. S. A.

PUBLISHED BY
THE WILLIAMS & WILKINS COMPANY
BALTIMORE, MARYLAND

SOIL SCIENCE

Editor-in-Chief
FIRMAN E. BEAR

Associate Editor
WILLIAM J. HANNA

Managing Editor
RUTH M. FIELD

CONSULTING EDITORS

- R. B. ALDERFER**
Rutgers University, New Brunswick, New Jersey
- LYLE T. ALEXANDER**
U. S. Plant Industry Station, Beltsville, Maryland
- W. H. ALLAWAY**
Soil and Animal Nutrition Lab., New York
- SHIGENORI AOMINE**
Kyushu University, Fukuoka, Japan
- C. A. BLACK**
Iowa State University, Ames
- J. A. BONNET**
University of Puerto Rico, Rio Piedras
- C. A. BOWER**
U. S. Regional Salinity Lab., Riverside, California
- F. E. BROADBENT**
University of California, Davis
- E. C. CHILDS**
Cambridge University, Cambridge, England
- MARLIN G. CLINE**
Cornell University, Ithaca, New York
- N. T. COLEMAN**
University of California, Riverside
- L. DELEENHEER**
Royal Agricultural College, Ghent, Belgium
- MACK DRAKE**
University of Massachusetts, Amherst
- M. M. ELGABALI**
Alexandria University, Alexandria, Egypt
- WOLFGANG FLAIG**
Soil Biochem. Inst., Braunschweig-Volkenrode, W. Germany
- STERLING B. HENDRICKS**
U. S. Plant Industry Station, Beltsville, Maryland
- S. HENIN**
National Center Agronomic Res., Paris, France
- M. L. JACKSON**
University of Wisconsin, Madison
- HANS JENNY**
University of California, Berkeley
- H. L. JENSEN**
State Laboratory of Plant Culture, Lyngby, Denmark
- LOUIS T. KARDOS**
Pennsylvania State University, University Park
- CHARLES E. KELLOGG**
U. S. Soil Conservation Service, Washington, D. C.
- DON KIRKHAM**
Iowa State University, Ames
- GEORGE W. KUNZE**
Agr. and Mech. College of Texas, College Station
- J. LÅG**
Agricultural College of Norway, Vollebekk
- KIRK LAWTON**
Michigan State University, East Lansing
- PHILIP F. LOW**
Purdue University, Lafayette, Indiana
- C. E. MARSHALL**
University of Missouri, Columbia
- W. P. MARTIN**
University of Minnesota, St. Paul
- A. R. MIDGLEY**
University of Vermont, Burlington
- E. G. MULDER**
Agricultural College, Wageningen, The Netherlands
- A. G. NORMAN**
University of Michigan, Ann Arbor
- ROBERT W. PEARSON**
U. S. Plant Industry Station, Beltsville, Maryland
- MICHAEL PEECH**
Cornell University, Ithaca, New York
- E. R. PURVIS**
Rutgers University, New Brunswick, New Jersey
- S. P. RATCHAUDHURI**
Indian Agr. Res. Institute, New Delhi
- C. I. RICH**
Virginia Polytechnic Institute, Blacksburg
- L. A. RICHARDS**
U. S. Regional Salinity Lab., Riverside, California
- E. W. RUSSELL**
East African Agr. and For. Res. Organ., Kikuyu, Kenya
- LLOYD F. SEATZ**
University of Tennessee, Knoxville
- ROY W. SIMONSON**
U. S. Soil Conservation Service, Washington, D. C.
- C. G. STEPHENS**
Division of Soils, C.S.I.R.O., Adelaide, S. Australia
- A. B. STEWART**
Macaulay Inst. Soil Res., Aberdeen, Scotland
- N. H. TAYLOR**
Soil Bureau, D.S.I.R., Lower Hutt, New Zealand
- J. C. F. TEDROW**
Rutgers University, New Brunswick, New Jersey
- STEPHEN J. TOTH**
Rutgers University, New Brunswick, New Jersey
- R. C. TURNER**
Soil Research Institute, Dept. Agr., Ottawa, Canada
- T. WALSH**
The Agricultural Institute, Dublin, Ireland
- LAMBERT WIKLANDER**
Royal Agricultural College, Uppsala, Sweden

HONORARY CONSULTING EDITORS: Wm. A. Albrecht; R. V. Allison; L. D. Baver; R. H. Bray; G. B. Bodman; Richard Bradfield; H. J. Conn; H. P. Cooper; O. W. Davidson; E. E. DeTurk; F. L. Duley; Willard Gardner; C. D. Jeffries; W. P. Kelley; Herminie B. Kitchen; H. Lundergårdh; Sante Mattson; W. T. McGeorge; A. Mehlich; C. A. Mooers; J. B. Page; W. H. Pierre; Arthur L. Prince; C. O. Rost; E. J. Russell; M. B. Russell; C. J. Schollenberger; Oswald Schreiner; Robert L. Starkey; E. Truog; S. C. Vandecaveye; N. J. Volk; and Selman A. Waksman.

COPYRIGHT © 1964, THE WILLIAMS & WILKINS COMPANY

CONTENTS

Ernest E. DeTurk (1887-1963)	3
Tolerance of Plants to Lithium. F. T. BINGHAM, A. L. PAGE, AND G. R. BRADFORD	4
Solubility of Variscite. A. W. TAYLOR AND E. L. GURNEY	9
Dew in Israel and Its Effect on Plants. A. DUVDEVANI	14
Planosolic Piedmont Soils of North Carolina: I. Morphology and Composition. R. J. McCracken, S. B. Weed, and E. F. Goldston	22
Phosphorus Fractions in Selected Soil Profiles of El Salvador as Related to Their Development. WILLIAM C. DAHNKE, JOHN L. MALCOLM, AND MIGUEL E. MENÉNDEZ	33
Properties of Protein-Bentonite Complexes as Influenced by Equilibration Conditions. DAVID E. ARMSTRONG AND G. CHESTERS	39
Soil Investigations on Banks Island. J. C. F. TEDROW AND L. A. DOUGLAS	53
NOTE: Precipitation of Sr by CaCO_3 in Calcareous Soils and Measurement of Cation-Exchange Capacity. E. HALEVY AND Y. TZUR	66
Book Reviews	68
Possible Role of Methane in Affecting the Hydraulic Conductivity of Fine Quartz Sand. DALE SWARTZENDRUBER AND RAJINDER P. GUPTA	73
Availability of Residual Phosphorus as Measured by Alfalfa Yields, Phosphorus Uptake, and Soil Analysis. J. R. THOMAS	78
A Study of Aluminum in Rice Soils. ROBERT B. CATE, JR. AND A. P. SUKHAI	85
A Radioactive-Tracer Method for Measuring the Stability of Sparingly Soluble Phosphates in Soil. FAYEZ M. ABDOU AND SIGURD LARSEN	94
Effect of Cation Size and pH on Potassium Exchange in Nason Soil. C. I. RICH	100
Effect of Temperature and Trapped Air on the Energy Status of Water in Porous Media. R. S. CHAHAL	107
Maintenance of Permanent Irrigation Agriculture. W. P. KELLEY	113
Mineralization of Carbon and Nitrogen in Some New Zealand Allophanic Soils. F. E. BROADBENT, R. H. JACKMAN, AND JOY McNICOLL	118
Physical Properties of Soil Mixes. S. J. RICHARDS, J. E. WARNEKE, A. W. MARSH, AND F. K. ALJIBURY	129
Comparison of Reagents for Soil Organic Matter Extraction and Effect of pH on Subsequent Separation of Humic and Fulvic Acids. T. L. YUAN	133
Book Reviews	142
An Examination of the pH of Calcareous Soils. J. S. CLARK	145
Determination of Forms of Sodium Which Are Not Water-Soluble But Dissolve in Ammonium Acetate. RACHEL LEVY AND ELIAHU MOR (MURAVSKY)	152
Effect of Moisture Regime and Stage of Plant Growth on Moisture Use by Cotton. B. D. DOSS, D. A. ASHLEY, AND O. L. BENNETT	156
Growth of Jack Pine (<i>Pinus banksiana</i> , Lamb.) Plantations in Relation to Fertility of Non-Phreatic Sandy Soils. S. A. WILDE, J. G. IYER, CH. TANZER, W. L. TRAUTMANN, AND K. G. WATTERSTON	162
Effect of Liming on the Availability of Zinc and Copper. A. L. BROWN AND J. J. JURINAK	170
Influence of Soil Strength on the Root-Growth Habits of Plants. HOWARD M. TAYLOR AND EARL BURNETT	174
Influence of Stable Sr and Ca on Sr90 and Ca45 in Soils and Clay Minerals. H. NISHITA AND P. TAYLOR	181
The Morphological-Chemical Problem in Solodized Soils. E. M. WHITE	187
An Inflow-Advance-Storage Method for Determining Infiltration in Irrigated Furrows. HOLLIS SHULL	192
Organo-Metallic Interactions in Soils: 3. Properties of Iron- and Aluminum-Organic-Matter Complexes, Prepared in the Laboratory and Extracted from a Soil. M. SCHNITZER AND S. I. M. SKINNER	197
Fractionation of Soil Phosphorus in Four Jordan Plot Soils. A. B. AWAN AND A. C. RICHER	204

NOTE: Gollan's Model B Elutriator. JOSUÉ GOLLAN.....	206
NOTE: Required Per Cent Air Space for Normal Growth of Sugar Cane. FRANK E. ROBINSON.....	206
Book Reviews.....	208
Cation-Activity Ratios in Equilibrium Soil Solutions and the Availability of Magnesium. R. C. SALMON.....	213
Biological Clogging of Sands. Y. AVNIMELECH AND Z. NEVO.....	222
Soil Test Calibration with Irish Potato Yields. C. A. JAWORSKI AND W. J. HANNA.....	227
Moisture and Strength Relationships of Soils as Affected by 4-Tert. Butylpyrocatechol. JOHN B. HEMWALL AND KEITH B. BOZER.....	235
Water Table Changes and Soil Moisture Loss Under Frozen Conditions. W. O. WILLIS, H. L. PARKINSON, C. W. CARLSON, AND H. J. HAAS.....	244
Reactions of Ammonium Phosphate with Gibbsite and with Montmorillonitic and Kaolinitic Soils. YUSUF N. TAMIMI, YOSHINORI KANEHIRO, AND G. DONALD SHERMAN.....	249
Morphological-Chemical Relationships of Some Thin A Horizon Solodized Soils Derived From Moderately Fine Material On A Well-Drained Slope. E. M. WHITE.....	256
Modified Classification Procedure for Rating Irrigation Waters. B. K. HANDA.....	264
Growth and Chemical Composition of Citrus Seedlings As Influenced by Na Additions to Soils Low in Exchangeable K. A. L. PAGE AND J. P. MARTIN.....	270
A Theoretical Approach to the Movement of Strontium Through Soils. M. J. FRISSEL AND P. POELSTRA.....	274
Book Reviews.....	278
Crystallization of Mixed Iron and Aluminum Gels. M. C. GASTUCHE, T. BRUGGENWERT, AND M. M. MORTLAND.....	281
Moisture Profile Development and Air Compression During Water Uptake by Bounded Porous Bodies: 1. Theoretical Introduction. E. G. YOUNGS AND A. J. PECK.....	290
An Inexpensive Portable Unit for Perchloric Acid Digestions and Semimicro-Kjeldahl Determinations. D. L. MADER AND M. C. HOYLE.....	295
A Simple Ratio Scheme for Expressing Particle-Size Distribution in Soils. K. B. SANDERS.....	300
Aluminum and Iron Fixation in Relation to Exchangeable Hydrogen in Soils. J. S. CLARK.....	302
A Study of Bulk Density and Water in A Swelling Soil. W. E. FOX.....	307
Saturated and Unsaturated Flow Equation in an Unstable Porous Medium. DAN ZASLAVSKY.....	317
Moisture Use By Forage Species as Related to Pan Evaporation and Net Radiation. B. D. DOSS, O. L. BENNETT, AND D. A. ASHLEY.....	322
Infrared Spectrophotometric Analysis of Some Carbonyl Compounds Adsorbed on Bentonite Clay. G. OLOF LARSON AND LARRY R. SHERMAN.....	328
Nitrate Diffusivity in Relation to Moisture Content of Non-Adsorbing Porous Media. M. J. M. ROMKENS AND R. R. BRUCE.....	332
The Internal Nitrogen Requirement of Sugarcane. GEORGE STANFORD AND A. S. AYRES.....	338
NOTE: Soil Aggregates Do Not Necessarily Break Down Over-Winter. FREDERICK BISAL AND KENNETH F. NIELSEN.....	345
Book Reviews.....	347
Measurement of Cation- and Anion-Exchange Capacities of Roots Using NaCl Exchange. R. J. BARTLETT.....	351
Some Effects of Gamma Radiation on the Composition of the Soil Solution and Soil Organic Matter. H. J. M. BOWEN AND P. A. CAWSE.....	358
Effect of Cu on the Distribution of P, Ca, and Fe in Barley Plants. J. C. BROWN AND C. D. FOY.....	362
Soil Dehydrogenase Activity. L. E. CASIDA, JR., D. A. KLEIN, AND THOMAS SANTORO.....	371
Effect of Ca-Saturated Soils on the Conductance and Activity of Cl^- , SO_4^{--} , and Ca^{++} . GORDON R. DUTT AND WAYNE D. ANDERSON.....	377
Boron Adsorption Equilibrium in Soils. S. SHAH SINGH.....	383
Changes in Redox Potential and Phosphorus Availability in Submerged Soils. N. K. SAVANT AND R. ELLIS, JR.....	388

CONTENTS

v

Soil and Tree Potassium Contents Related to Tree Growth. I. HNO_3 -Extractable Soil K. EDWIN H. WHITE AND ALBERT L. LEAF.....	395
Zinc, Copper, and Cobalt Status of Punjab Soils. N. S. RANDHAWA AND J. S. KANWAR.....	403
Soil Properties in Relation to Exchangeable Cations and Kinds of Exchange Material. W. P. KELLEY.....	408
NOTE: Cracking Characteristics and Field Capacity in a Swelling Soil. W. E. FOX....	413
Index.....	414